7. Evaluation of Interim Effluent Management Alternatives

The City of Hollister has identified recycled water irrigation as its Long-Term Effluent Management Strategy. Until such time as the City can more definitively identify and develop a market for its recycled water, it must implement an interim effluent management strategy. This Section provides an evaluation of interim effluent management strategies. This analysis was conducted as a collaborative effort between the City, SBCWD and the County. These agencies developed alternative interim effluent management projects as well as, the selection criteria to analyze the projects under consideration, and recommended a Phase I Interim Effluent Management Project (Phase I Project), that would best meet their needs.

7.1. Project Background

The MOU is an agreement between the City, SBCWD and the County to collaborate in preparing the *Hollister Urban Area Water and Wastewater Master Plan* (Master Plan). This Master Plan is being prepared in order to anticipate the need for additional wastewater disposal and to identify future wastewater infrastructure improvements. The MOU also sets recycled water TDS objectives of 500 mg/L, but not greater than 700 mg/L, by the year 2015. Other items considered in the MOU include discharge issues, drinking water TDS objectives, and impacts to the environment, economy and local culture. The anticipated completion date for this Master Plan is in December 2006.

7.2. Section Organization

This Section will detail the evaluation and selection process that led to the selection of the Phase I Project.

7.3. Evaluation of Phase I Interim Effluent Management Projects

The City, the SBCWD and the County developed alternative effluent disposal options as well as selection criteria. A total of 18 effluent disposal options were evaluated. The disposal projects were reviewed as stand-alone projects or as a combination of projects from the following group of disposal options.

- Irrigation with recycled water
- Spray fields
- Storage via tanks and ponds
- Ocean Outfall/Discharge
- Surface water disposal
- Percolation
- Evaporation
- Export as construction water or to areas deficient in a water supply

The selection criteria utilized to select the near term project was based on the categories listed below.

- Date of Implementation
- RWQCB Compliance

- Construction & Operation Costs
- Area Requirements
- MOU Requirements
- Compliance with the *Hollister Urban Area Water & Wastewater Management Master Plan*

The above categories were further refined to form a selection matrix. The following sections provide detailed descriptions of the 18 effluent disposal options and as well as the selection matrix utilized to evaluate them.

7.3.1. Disposal Options & Criteria

The 18 effluent disposal options developed and evaluated are listed below:

- Operation with current Percolation/Storage Ponds
- 100% Percolation – New Ponds
- 100% Spray field – Reservoir
- 100% Spray field – Storage Tank
- 100% Spray fields and Irrigation
- Combination Spray field – new percolation ponds
- Constructed Wetlands
- 100% Subsurface Percolation/Leachfield – Community Infiltration
- Construction Water
- Deep Ground Injection
- RO and Brine Injection
- Export to Water Poor Areas
- Inject into Pajaro Pipeline
- Reclamation Plan Implementation
- Discharge to the San Benito River (Disposal/Restoration)
- Ocean Outfall/Discharge
- Storage Tanks
- Evaporation Tanks

Each of these options was evaluated on the basis of a series of selection criteria. The criteria presented below was used in this evaluation.

1. *Implementation Date - The date by which the disposal option can realistically be put into operation. Factors that influence the implementation date are the basic permitting and regulatory process, property acquisition, and the physical constraints associated with the time to construct.*
2. *Costs to Construct and Operate – Short-term and long-term costs associated with the options. The costs are calculated based upon the proposed 5 million gallon per day (MGD) facility. Costs are further divided into three sub-categories.*

a) *Capital Costs including engineering, permitting, property acquisition, and construction. Property acquisition costs are based on an average cost of $30,000.00 per acre.*

b) *Operations and maintenance including basic repairs and additional staff, but is exclusive of labor costs associated with the current City staff which it is assumed will be used for operations.*

c) *Annualized cost includes the costs for (a) and (b) combined for a 20-year period plus a factor for annual inflation and interest at 6.0%.*

3. *Area Requirements – Area required for a facility of the specified capacity including roads, parking areas, structures, and buffer zones. As a baseline for determining relative sizes of facilities using infiltration techniques, soil percolation rates were assumed to average approximately 4 minutes per inch. Observed and reported percolation rates in the area range from 0.65 to greater than 8 minutes per inch.*

4. *Compliance with the RWQCB Mandates – The various disposal options were discussed with RWQCB staff to get an idea of whether the implementation of the disposal option would lead to compliance with the mandate, current regulations, and RWQCB policy. Based on RWCB comments, options were evaluated on the basis of their potential to achieve compliance, not achieve compliance, or maybe achieve compliance.*

5. *Consistency with the Hollister Urban Area Water and Wastewater Management Master Plan - The City of Hollister (the City) is subject to a compliance order from the State of California Central Coast Regional Water Quality Control Board (RWQCB) that will require an upgrade to the City's existing treatment facility. Based on the actions of the RWQCB, the City has entered into an agreement with the San Benito County Water District (SBCWD) and the County of San Benito to develop a Hollister Urban Area Water and Wastewater Management Master Plan (Master Plan) to include a regional treated water management strategy. The Master Plan will contain a number of principles that define how treated water will be managed in the Hollister area* (Hollister, 2005).

From the above criterion a selection matrix was generated. A scale of 1- 10 (1 being the most favorable and 10 being the least favorable) was utilized to rank various effluent disposal options based upon the selection criteria prescribed in the MOU. These criteria are presented in **Table 7-1**. The implementation dates, costs, area requirements, and ability to achieve RWQCB compliance mandates were placed in a separate matrix or table for comparison purposes. These criteria are presented in **Table 7-2**.

The interim disposal options were also compared against a compliance issues discussed with the RWQCB. The compliance issues evaluated are listed in **Table 7-3**.

7.3.2. Recommended Effluent Management Strategy

The scoring process in **Table 7-1** ranks *100% Spray fields and Irrigation* as the highest ranked interim project, ***therefore, spray fields were recommended as the Phase I Interim Effluent Management Project***. The Phase I Project will be further developed in **Section 9**.

Table 7-1: City of Hollister Effluent Management MOU Selection Criterion

MANAGEMENT ALTERNATIVE	INCLUDES APPROPRIATE CONSIDERATION OF REGIONAL WASTEWATER DISCHARGE ISSUES (2.1.2)	INCLUDES CONSIDERATION OF FUTURE WASTEWATER DISPOSAL REQUIREMENTS (2.1.3)	PROVIDES FOR MAXIMUM REUSE OF WASTEWATER (2.1.3)	DOES NOT NEGATIVELY IMPACT DRINKING WATER SUPPLIES (2.1.3a)	DOES NOT NEGATIVELY IMPACT ADJACENT LAND USES (2.1.3a)	CONSISTENT WITH APPLICABLE GENERAL PLANS (2.1.3b)	CONSISTANT WITH QUANTITY, QUALITY, AND LEVEL OBJECTIVES FOR GROUNDWATER MGMT PLANS (2.1.3c)	COMPATABLE WITH APPROPRIATE BLENDING OF TREATED SURFACE WATER AND GROUNDWATER (2.1.4)	COMPATABLE WITH DIRECT USE OF URBAN WASTEWATER (2.1.4)	MINIMIZES NEGATIVE IMACTS ON LOCAL CULTURE, ECONOMY, AND ENVIRONMENT (2.1.7)	MEETS DISCHARGE REQUIREMENTS FOR TDS (<700 MG/L) (2.2.3)	COMPATABLE WITH CENTRALIZED TREATMENT (2.2.4)	COMPATABLE WITH AGRICULTURAL REUSE (2.2.7)	SCORE FOR COMPLIANCE WITH RECLAMATION PLAN	RANKING
Operate with Current Percolation/Storage Facilities	7	7	7	7	3	0	7	4	4	4	7	2	5	**64**	**13**
100% Percolation - New Ponds	2	2	4	3	4	0	2	2	2	3	4	2	3	**33**	**5**
100% Sprayfield - Reservoir	2	2	4	3	4	0	2	2	2	2	4	2	2	**31**	**3**
100% Sprayfield - Storage Tank	2	2	2	2	4	0	2	3	2	4	2	2	2	**29**	**2**
100% Sprayfields and Irrigation	2	2	4	2	3	0	2	2	2	2	2	2	2	**27**	**1**
Combination Sprayfield - new percolation ponds	2	2	4	3	4	0	2	2	2	3	4	2	2	**32**	**4**
Constructed Wetlands	7	5	7	7	7	0	7	7	7	7	7	2	7	**77**	**15**
100% Subsurface Percolation / Leachfield - Community Infiltration	2	4	7	3	2	0	2	2	4	2	4	2	7	**41**	**8**
Construction Water	5	5	4	3	2	0	4	7	3	2	3	4	7	**49**	**10**
Deep Ground Injection	4	5	3	5	2	0	4	7	7	3	3	2	7	**52**	**11**
R.O. and Brine Injection	4	5	3	2	2	0	4	7	7	2	2	2	7	**47**	**9**
Export to Water Poor Areas	3	2	2	2	2	0	3	7	2	3	2	2	7	**37**	**6**
Inject into Pajaro Pipeline	3	2	2	2	2	0	4	7	2	3	2	2	7	**38**	**7**
Reclamation Plan Implementation	4	5	3	4	2	0	3	4	2	3	4	4	3	**41**	**8**
Discharge to the San Benito River (Disposal/ Restoration)	3	3	5	5	2	0	4	7	7	4	3	2	4	**49**	**10**
Ocean Outfall/ Discharge	7	5	7	2	2	0	7	7	7	7	3	2	7	**63**	**12**
Storage Tanks	3	5	2	2	3	0	7	7	2	4	2	2	2	**41**	**8**
Evaporation Ponds	7	4	7	3	7	0	7	7	7	7	7	2	7	**72**	**14**

Notes:

1. Courtesy of the City of Hollister.

2. Scoring was performed by the City of Hollister, the San Benito County Water District, and San Benito County.

3. The numbers in paranthesis correspond to selected MOU Sections.

Table 7-2: City of Hollister Effluent Management Selection Criterion

MANAGEMENT ALTERNATIVE	IMPLEMENTATION DATE	APPROXIMATE CAPITAL COST - 5 MGD FACILITY (THOUSAND DOLLARS)	APPROXIMATE ANNUAL OPERATION COST - 5 MGD FACILITY (THOUSAND DOLLARS)	ESTIMATED ANNUALIZED COST OVER 20 YEARS - 5 MGD FACILITY (THOUSAND DOLLARS)	AREA REQUIRED FOR 5 MGD CAPACITY (ACRES)	ACHIEVES AND MAINTAINS RWQCB COMPLIANCE
Operate with Current Percolation/Storage Facilities	A = 2007	N/A		N/A	Current facilities not adequate.	NO
100% Percolation - New Ponds	A = 2007	B = $5-10 million	(3)	III	50	YES
100% Sprayfield - Reservoir	A = 2007	E = $20-25 million	(1)-(2)	V	1500	YES
100% Sprayfield - Storage Tank	B = 2010	F - $83	(1)-(2)	VI - $7.3	1500	YES
100% Sprayfields and Irrigation	B = 2010	E = $20-25 million	(1)	V	1500	YES
Combination Sprayfield - new percolation ponds	A = 2007	D = $15-20 million	(1)-(2)	V	500-1000	YES
Constructed Wetlands	C =2015	C = $10-15 million	(1)	III	70	NO(?)
100% Subsurface Percolation / Leachfield - Community Infiltration	A-B = 2007-2010	C = $10-15 million	(1)-(2)	III	50	YES
Construction Water	D = 2015+	E = $20-25 million	(1)	IV	0	MAYBE
Deep Ground Injection	C =2015	C = $10-15 million	(4) - $1.6	IV	20	MAYBE
R.O. and Brine Injection	D = 2015+	E = $20-25 million	(4) - $1.6	IV	20	YES
Export to Water Poor Areas	D = 2015+	?	(1)	?	?	YES
Inject into Pajaro Pipeline	C =2015	F - $26	(1)	V	70	YES
Reclamation Plan Implementation	C =2015	E = $20-25 million	(1)	V	1500	YES
Discharge to the San Benito River (Disposal/ Restoration)	C =2015	B = $5-10 million	(1)	II	5	MAYBE
Ocean Outfall/ Discharge	D = 2015+	F - $56	(4) - $0.2	V	150	NO
Storage Tanks	C =2015	F - $1852	(1)	VI - $161	175	MAYBE
Evaporation Ponds	A-B = 2007-2010	F - $89	(2)	VI - $7.7	2100	NO

Date Key	Cost Key	Operation Cost Key	Annualized Costs Key	Color Key
A - By 2007	N/A - Not Applicable	(1) - <$50K	I - <$100K	NO
B - By 2010	A - <$5 Million	(2) - $50K to $100K	II - $100K to $500K	CHANGES IN CONDITIONS MAY ALLOW PERMITTING
C - By 2015	B - $5 to 10 Million	(3) - $100K to $200K	III - $500K to $1 Million	PART OF A LARGER SOLUTION
D - After 2015	C - $10 to $15 Million	(4) - ≥ $200K(1)	IV - $1 Million to $2 Million	YES
	D - $15 to $20 Million	(1) - Approximate costs	V - $2 Million to $5 Million	
	E - $20 to $25 Million		VI - ≥ $5 Million(1)	
	F - ≥ $25 Million(1)		(1) - Approximate costs in millions of dollars	
	(1) - Approximate costs in millions of dollars			

Notes:

1. Courtesy of the City of Hollister.

2. Analysis was performed by the City of Hollister, the San Benito County Water District, and San Benito County.

3. Detailed information for the Compliance Column (last column in table) can be found in Table 7-3.

Table 7-3: City of Hollister Effluent Management Selection Criterion for Compliance Challenges

	MANAGEMENT ALTERNATIVE	ACHIEVES AND MAINTAINS RWQCB COMPLIANCE	COMPLIANCE HURDLES (Based on conversations with RWQCB staff)	Additional Comments
1	Operate with Current Percolation/Storage Facilities	NO	The current treatment and percolation facilities do not comply with the RWQCB's requirements, and are in violation. Additionally, the City of Hollister is under orders to discontinue disposal of municipal wastes at the City Industrial treatment facility.	
2	100% Percolation - New Ponds	YES	Generally acceptable, already used in the region, and is considered a preferred alternative by the RWQCB, requires an RWQCB waste discharge permit.	
3	100% Sprayfield - Reservoir	YES	Generally acceptable, already used in other areas, requires an RWQCB waste discharge permit.	
4	100% Sprayfield - Storage Tank	YES	Generally acceptable, currently proposed for other areas, requires an RWQCB waste discharge permit.	
5	100% Sprayfields and Irrigation	YES	Generally acceptable, already used in other areas, requires an RWQCB waste discharge permit.	
6	Combination Sprayfield - new percolation ponds	YES	Generally acceptable, already used in other areas, requires an RWQCB waste discharge permit.	
7	Constructed Wetlands	NOT NOW	Subject to permitting by the RWQCB, and possibly DFG, USFWS, and USACE. RWQCB does not consider this an acceptable option because water quality degrades due to evaporative concentration of TDS and nitrate wastes associated with large numbers of birds and other wildlife that are attracted to and inhabit the wetland.	Acceptable in other areas, so may be subject to change.
8	100% Subsurface Percolation / Leachfield - Community Infiltration Gallery	YES	Generally acceptable, already used in other areas, requires an RWQCB waste discharge permit.	
9	Construction Water	MAYBE	May require an RWQCB waste discharge permit, acceptability is restricted based on the proposed location for use.	This item is more applicable as a component of the solution rather than the solution due to the volume of product requiring disposal.
10	Deep Ground Injection	MAYBE	Acceptability is dependent on the compatibility between treated water and the zone into which the water is injected. Requires permitting from both the RWQCB and CONSRV.	
11	R.O. and Brine Injection	YES	Acceptable in principle, but dependent on the compatibility between treated water and the zone into which the water is injected. Requires permitting from both the RWQCB and CONSRV.	
12	Export to Water Poor Areas	YES	Generally acceptable, already used in other areas, may require an RWQCB waste discharge permit.	
13	Inject into future Pajaro Pipeline	MAYBE	Generally acceptable, may require an RWQCB waste discharge permit.	Pipeline has not yet been built
14	Reclamation Plan Implementation	YES	Generally acceptable, already used in the region, and is considered a preferred alternative by the RWQCB, some aspects require an RWQCB waste discharge permit.	
15	Discharge to the San Benito River (Disposal/ Restoration)	MAYBE	Subject to permitting by the RWQCB, and possibly DFG, USFWS, and USACE. Generally acceptable, already used in the region, and is considered a preferred alternative by the RWQCB.	There is strong opposition from downstream communities.
16	Ocean Outfall/ Discharge	NO	Subject to permitting by the RWQCB, and possibly DFG, USFWS, and the California Coastal Commission. RWQCB does not consider this an acceptable option because of water quality incompatibility issues between the treated water and the marine environment. Technically practical locations for ocean discharge in the region are in areas designated as environmentally sensitive or protected.	
17	Storage Tanks	MAYBE	Acceptability and permitting requirements are dependent on the eventual final use of the stored water.	Still need to ultimately dispose of the product, but it may work as a part of a larger solution.
18	Evaporation Ponds	NO	Subject to permitting by the RWQCB, and possibly DFG, USFWS, and USACE. RWQCB does not consider this an acceptable option because water quality degrades due to evaporative concentration of TDS and nitrate wastes associated with large numbers of birds and other wildlife that are attracted to ponds of the size required.	

Notes:
1. Courtesy of the City of Hollister.
2. Analysis was performed by the City of Hollister, the San Benito County Water District, and San Benito County.

RWQCB - State of California Regional Water Quality Control Board, Ce
DFG- State of California Department of Fish and Game
USFWS - United States Fish and Wildlife Service
USACE - United States Army Corps of Engineers
TDS - Total Disolved Solids
CONSERV - State of California Department of Conservation